Supplementary Notes on American Menispermaceae IX

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Since the last serial paper (Supplement VIII) was published we have examined 162 new collections, extending our knowledge of several species previously known from incomplete material. Staminate flowers of Telitoxicum minutiflorum, Abuta brevifolia and Orthomene verruculosa and fruits of Chondrodendron microphyllum and Telitoxicum peruvianum are described for the first time; extensions of range are reported for 13 species; one species, Abuta fluminum, is described as new, and one new combination, Telitoxicum negroense, is proposed.

During the last 3 years numerous samples of wood were sent to Prof. Yasuo Inubushi of Kyoto University for chemical studies. These samples were mostly collected by Dr. G. Prance and Sr. Nilo Silva in Brazil and by Dr. J. Schunke Vigo in Peru. Samples of several species of Abuta were found to be free of alkaloids. For the isolation and identification of certain alkaloids see under Chondrodendron tomentosum and Sciadotenia toxifera.

I. CHONDRODENDRON Ruiz & Pavón, Syst. Veg. 261. 1798.

1. Chondrodendron tomentosum Ruiz & Pavón, Syst. Veg. 261. 1798.

Peru: San Martín, Mariscal Cáceres, Tocache Nuevo, Schunke 3880, 4801 (F).

According to a private communication from Prof. Yasuo Inubushi of Kyoto University two already known alkaloids, isochondodendrine and curine, were isolated from Schunke 1970/19 and identified; another alkaloid found in very minute quantities was not further investigated.

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2. Chondrodendron platiphyllum (A. de St. Hilaire) Miers, Ann. Mag. Nat. Hist. III. 19:122. 1867.

Brazil: Rio Grande do Norte: Baia Formoza, Engº Estrêla, Mello Filho 1725 (Mus. Nac. Rio 108713) (R).

This is the first record of the species from Rio Grande do Norte.

3. Chondrodendron microphyllum (Eichler) Moldenke in Krukoff & Moldenke, Brittonia 3:11. 1938.

Brazil: Rio Grande do Norte, matos do Eugenho Estrêla, Mello Filho 1564 (R).

This is the first record of the species collected outside the State of Bahia.

The fruits of this species, previously unknown, became available to us. They are essentially as of other species of the genus, as described in Supplement #8. There are six carpels radially diverging from a clavate receptacle, all free from each other. The drupe is glabrous, its body oblong-ellipsoid, 1.5-1.6 x 1-1.3 cm, abruptly contracted at base into a stipelike neck 1.5-3 mm long and ±1.5-2 mm diam. The thin-shelled endocarp is pale-brown and shows the same exterior pattern of nervature as that of Sciadotenia, but more delicate and less deeply incised. Study of the fruit confirms the generic disposition of C. microphyllum hitherto isolated in Chondrodendron because of the unique synandrium of the staminate flower. (Belem & Pinheiro 2317, 2732; Belém 3505).

II. CURAREA Barneby & Krukoff, Mem. N. Y. Bot. Gard. 22(2):7. 1971.

1. Curarea toxicofera (Weddell) Barneby & Krukoff, Mem. N. Y. Bot. Gard. 22(2):9. 1971.

Brazil: Amazonas: Prance et al. 13931 (basin of Rio Purus, Rio Apitua, forest on terra firme); L. Coêlho & D. Coêlho 41 (= INPA 27989) (Janauaca), Prance et al. 11272 (near Manaus). Peru: San Martin: Mariscal Caceres, Dtto. Tocache Nuevo, Schunke 3830.

Local names: "Bicava" (Jamamadi Indians). Prance states on the label: "stem bark used by Jamamadi Indians as ingredient of arrow and dart poison mixed with Prance et al. 13929 (stem bark) ("Irá") - Strychnos solimoesana Krukoff, Prance et al. 13936 (stem bark) ("Boá") - Guatteria cf. megalophylla Diels, and Prance et al. 13937 (stem bark) ("Balala") - Fagara sp."

2. Curarea candicans (L. C. Richard) Barneby & Krukoff, Mem. N. Y. Bot. Gard. 22(2):12. 1971.

Venezuela: Bolívar: near El Dorado, B. Rollet s.n. (VEN).

This is the first record of the genus from Venezuela.

In order to verify our reduction of Chondodendron limaciifolium to Curarea candicans (See Supplement #8) we borrowed Siqueira s.n. (HAMP 8266) (0°fl.) (type coll. of Abuta limaciifolia Diels) and coll. undesign. s.n. (HAMP 9565) (frts.) from Museu Paraense Emílio Goeldi. The flowers agree with those of C. candicans and not with what we designated C. tecunarum; the fruits are a perfect match for these of C. candicans as represented by Forest Dept. 3623 (K) from Guiana.

3. Curarea tecunarum Barneby & Krukoff, Mem. N. Y. Bot. Gard. 22(2):12. 1971.

Brazil: Amazonas: Prance et al. 16146 (basin of Rio Negro, foothills of Serra Curicuriari), 16453 (basin of Rio Purus, Rio Cunhua at Deni Indian village, 6°43' S, 66° 47' W).

Prance states on the label (Prance 16453): "the stem is crushed, placed in water and stirred; the mixture is drunk as a contraceptive by Deni Indians."

This is the first record of the species from the basin of Rio Purus.

III. SCIADOTENIA Miers in Ann. Nat. Hist. II, 7:43. 1851.

1. Sciadotenia cayennensis Bentham, Jour. Linn. Soc. Bot. 5 (Suppl. 2):51. 1861.

French Guiana: Oldeman 1977 (CAY), 3180 (CAY) and DeGranville 654 (CAY) (near Saul); Oldeman B-1899 (CAY) (upper Approuague); DeGranville C-79 (CAY) (Grand Inuni); Oldeman T-715 (CAY) (upper Oyapock).

The cited collections from four widely separated localities present additional evidence that S. cayennensis is well distributed in French Guiana.

2. Sciadotenia toxifera Krukoff & A. C. Smith, Bull. Torrey Club 66:308. 1939.

Brazil: Amazonas: Rio Auati Parana, igapo, Byron 310 (=INPA 28171). Peru: San Martín: Mariscal Cáceres, Tocache Nuevo, Schunke 1971/30, 1971/32, 3819, 3953, 4605 (F), 4634 (F), 4637 (F), 4639 (F), 5024.

According to a private communication from Prof. Yasuo Inubushi of Kyoto University two already known alkaloids--d-O, O-dimethylcurine and l-isochondodendrine were isolated from Schunke 1971/30, also one new alkaloid which was designated as epinorcycleanine. The already known alkaloid, cycleanine has been isolated from Cyclea insularis Makino, Stephania cepharantha Hayata and other plants.

4. Sciadotenia paraensis (Eichler) Diels in Engler, Pflanzenreich 4(94):86. 1910.

Brazil: Pará: Bragança, J. S. dos Santos s.n. (HAMP 7290).

5. Sciadotenia sagotiana (Eichler) Diels in Engler, Pflanzenreich 4(94):86. 1910.

Brazil: Amazonas: near Manaus, W. Rodrigues s.n. (7/12-1954) (INPA 333), Chagas s.n. (16/2-1956) (INPA 3445).

The collections cited provide additional evidence that the species is common in "capoeiras" near Manaus.

7. Sciadotenia sprucei Diels in Engler, Pflanzenreich 4(94):84. 1910.

Venezuela: Amazonas: basin of Rio Negro, coll. undesign. s.n. (Dec. 15, 1955) (Z). Brazil: Pará: A. Miles Moss 90 (US); Amazonas: near Manaus, Froes 30178 (INPA), W. Rodrigues s.n. (28/9-1954) (INPA 164), Chagas s.n. (28/9-1954) (PG).

12. Sciadotenia amazonica Eichler in Flora 47:395. 1864 and in Martius, Fl. Bras. 13[1]:201, tab. 47, fig. 3. 1864.

Peru: Loreto: near Iquitos, Erik Asplund 14096 (S), 14469 (S).

13. Sciadotenia duckei Moldenke in Krukoff & Moldenke, Brittonia 3:30. 1938.

Brazil: Amazonas: near Manaus, Herb. Schwacke 551 (Mus. Nac. Rio 45432) (R), 3467 (Jard. Bot. Rio 85196) (RB), W. Rodrigues s.n. (25/3-1955) (INPA 908), 8864 (23/4-1970) (INPA 28079), J. Chagas s.n. (25/3-1955) (PG), Prance et al. 11620.

The collections cited above provide additional evidence that the species is common in "capoeiras" near Manaus.

14. Sciadotenia pachnococca Krukoff & Barneby, Mem. N. Y. Bot. Gard. 22(2):24. 1971.

Brazil: Amazonas: basin of Rio Negro, Rio Uneiuxi, ±300 km above mouth, Prance et al. 15558 (Makú Indian village).

This is the second collection of the species.

V. TELITOXICUM Moldenke, Brittonia 3:42. 1938.

1. Telitoxicum minutiflorum (Diels) Moldenke in Krukoff & Moldenke, Brittonia 3:49. 1938.

Brazil: Amazonas: basin of Rio Negro, 2 kms above Tapuruquara, forest on terra firme, Prance 15386.

Excellent staminate inflorescences and flowers recently became available to us: staminate inflorescence solitary and paired from axils of living leaves, appearing simply racemose, the primary axis densely puberulous, 0.6--1 mm diam, 5--13 cm long, the flowers borne in subsessile 2--4-flowered cymules, these toward the base elevated on secondary axis not over 2 mm long; pedicels up to 0.5 mm long; flowers glabrous except for the tips of outer sepals, black when dry, or subglaucescent; 3 outer sepals ovate 0.7 X 0.45, 3 inner ovate, submembranous-margined, the tips incurved-connivent over the anthers, ±1.5 X 1.1 mm; 6 petals, ±0.5 mm long, vase-shaped, contracted at base into a narrow funnel, the margins incurved but not enfolding the opposed stamen; androecium 6-merous, glabrous, the filaments all free, erect, straight or a trifle incurved, slightly enlarged upward, the whole 0.55 mm long, the anther-sacs terminal, erect, collateral, 0.15 mm long, dehiscent by vertical slits. (Tessmann 4626 (G), 4565 (isotype) (G).

4. Telitoxicum glaziovii Moldenke in Krukoff & Moldenke, Brittonia 3:47. 1938.

Brazil: basin of Rio Jari, Nilo T. Silva 3423, 3434.

6. Telitoxicum peruvianum Moldenke in Krukoff & Moldenke, Brittonia 3:45. 1938.

Peru: San Martin: Mariscal Caceros, Tocache Nuevo, Schunke 1971/36, 4746 (K); San Martin Loreto: vicin. of Aguaytia, Mathias & Taylor 5022 (LA).

Inflorescence ♀ simply racemose, few-flowered, the fruiting pedicels becoming ±8—10 mm long, 4--5 mm diam; drupe subsymmetrically ovoid-ellipsoid, 3—3.3 cm long, 2--2.2 cm diam, slightly compressed, the mealy-coriaceous exocarp ±2 mm thick, when dry black externally, glabrous or almost so, the pulpy mesocarp up to 1 mm thick, the leathery testa of the endocarp

scarcely sculptured or engraved, 0.25--0.4 mm thick in section. (Schunke 1971/36).

The second and third records for T. peruvianum and the first pistillate plants collected. The fruit differs little from that of the closely related T. glaziovii of the lower Amazon. The collector notes on the label of Schunke 4746 "el tallo es aredondeado en la interior amarillo pálido, semi-amargo".

7. Telitoxicum negroense (Krukoff & Moldenke) Krukoff, comb. nov.

In the protologue Abuta negroensis was distinguished from all known Amazonian members of tribes Triclisieae and Anomospermeae by its pinnately veined leaf-blades woolly beneath. In absence of flowers, the affinity could not be made out for certain, and the species was referred provisionally to Abuta, of which some species, notably A. candollei, A. grisebachii, and A. splendida, have similar vesture, although combined with plinerved blades. Recently an isotype (Froes 12423, GH), not seen previously, was compared with material of Telitoxicum krukovii and found to resemble this species very closely in form and nervation of the leaves. Pinnate blades are characteristic of genus Telitoxicum. In this genus T. negroense will be readily recognized by its tomentose vesture.

VI. ABUTA Barrère ex Aublet, Pl. Guyane 1:618, pl. 250. 1775.

2. Abuta splendida Krukoff & Moldenke, Bull. Torrey Club 68: 241. 1941.

Venezuela: Manara 165 (VEN); Amazonas: Reserva Forestal El Sipapo, Blanco 1173 (VEN). Brazil: Para: basin of Rio Jari, Nilo T. Silva 3433; basin of Rio Tapajos, near Santarem, Cavalcante 1773 (PG). Terr. Roraima: Rio Mucajai, Prance et al. 11036. Peru: San Martin: Mariscal Cáceres, Tocache Nuevo, Schunke 1971/38; Huanuco: Leoncio Prado, Dtto. Rupa Rupa, Schunke 5168.

Blanco 1173 is the first record of the species from Amazonas (Venezuela). The label on Schunke's specimen reads: "El tallo es aplastado, en la parte exterior de color negruzco; y en la interior amarillo pálido con sabor muy amargo".

6. Abuta aristeguietae Krukoff & Barneby, Mem. N. Y. Bot. Gard. 20(2):21. 1970.

Peru: Huanuco: Monzon, elev. 800 m, Woytkowski 5535 (GH).

9. Abuta pahni (Martius) Krukoff & Barneby, Mem. N. Y. Bot. Gard. 22(2):43. 1971.

Venezuela: Bolívar: Alto Caroni, alt. 800 m, F. Cardona 2601 (L). Brazil: Amazonas: Schultes 9840c (IAN). Peru: San Martín: Mariscal Cáceres, Tocache Nuevo: Schunke 1970/28, 4559 (F), 4966 (F).

The label on Schunke's specimen reads: "El tallo mide 4" de dia., en la parte interior es de color amarillo intenso, con sabor amargo".

10. Abuta fluminum Krukoff & Barneby, sp. nov.

A. pahni ac A. aristeguietae adspectu simulans, ab ambabus foliorum pube appressa brevissima sparsa, ab ea imprimis inflorescentia ♂ simpliciori, androecii dense spinuloso-papillati filamentis crasse clavatis dilatatis antherisque staminum interiorum collateralibus introrsis horizontaliter dehiscentibus exteriorum sublaterali-introrsis rima obliqua apertis, necnon drupae majoris extus pallide lenticellatae endocarpio profundissime insculpto, ab A. aristeguietae (cujus inflorescentia ♂ infauste ignota) inflorescentia ♀ laxa, pedicellis fructiferis elongatis, endocarpiique sculptura longius distat.

Weak woody vines, the blackish rope (acc. Schunke) round in section, the livid, non-lenticellate young stems pilosulous with subretrorse hairs up to 0.2--0.4 mm long, the leaf-blades beneath with forwardly appressed hairs up to 0.25--0.45 mm long dispersed along the veins and scattered between them; petioles slender 2--7 cm long, little dilated apically; leaf-blades (dry) membranous becoming subchartaceous, brownish-olivaceous, slightly paler beneath, ovate to broadly ovate-elliptic from a cuneate base, at immediate insertion shortly rounded and obtuse, short-acuminate at apex, (5) 7--14 cm long, (2.5) 4--7 cm wide; primary venation of 5 slender nerves from base, the outer pair weak, reaching ±1/3 length of blade, the inner pair incurved-ascending 2/3 its length, the costa giving rise from near or above middle to 1--2 pairs of secondaries, the primary ones impressed above or becoming so, the rest immersed or feebly prominulous above, prominent beneath, the reticulation above extremely fine and delicate, the smallest areoles ±0.1 mm diam, similar but a little coarser beneath; inflorescence ♂ subterminal to young branchlets or (acc. Asplund) on leafless stems, simply racemose or nearly so, 9--25 cm long, the primary axis 0.6--0.8 mm diam, the flowers disposed either 1--3 together in sessile glomerules or both sessile and elevated on short secondary axes less than 2.5 mm long; flower ♂: sepals 6, "green" when fresh, densely minutely strigulose externally, glabrous within, the outer 3 broadly deltate-ovate ±0.5--0.9 X 0.4--0.5 mm, the inner 3 broadly deltate to ovate-suborbicular 2--2.5 X 1.8--2.5 mm; androecium 1.5 mm long, the plumply claviform, densely spinulose-papillate filaments united at extreme base,

thence free, strongly incurved distally and connivent, the 3 outer ones 0.5--0.6 mm wide at apex, bearing the collateral anther-sacs introrsely, tilted over to bring the dehiscence-slit to horizontal, the 3 inner ones slightly less incurved, bearing the anther-sacs laterally separated by a narrow connective, the dehiscence-slit, because less tilted, appearing oblique; inflorescence 0 up to 6--8 cm long, loosely racemose, the fruiting pedicels 4--9 mm long, 2--3 mm diam; drupe obliquely oblong-ellipsoid, 2.8--3.8 cm long, 1.8--2.2 cm in greatest diameter, the mealy-coriaceous, glabrous or at least eventually glabrate exocarp dotted with pallid lenticels, ±0.6--0.7 mm thick in section, the mesocarpic pulp thin, scarcely fibrous, deciduous in papery plates when dry; endocarp up to 3.2 X 1.9 cm, the stiffly coriaceous testa deeply sculptured, the long outer curve traversed by 3 open grooves ±2 mm wide and 1 mm deep and separated by stout corrugated ridges up to 2--3 mm wide and 1--1.5 mm thick in section, the sides of the endocarp also deeply and sinuously engraved.

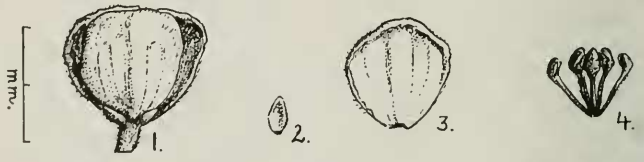
Peru: San Martín: Mariscal Cáceres, Tocache Nuevo, en bosque alto, Jose Schunke Vigo 1971/34 (NY-holotype, in fl.), 1971/33 (NY-paratype, in fr.). Ecuador: Los Ríos: Hacienda Clementina on Rio Pita, Erik Asplund 5463 (S).

In shape, texture, and venation of leaf-blades A. fluminum suggests the sympatric A. pahni, but differs in pubescence, and in important details of the staminate inflorescence, the androecium, and the drupe. The staminate flowers of A. pahni are borne in well-furnished cymules elevated on secondary branchlets; the vesture of the leaves is composed of more or less erect, setiform hairs; the drupe is small, smooth externally (non-lenticillate), and its endocarp is only shallowly sculptured. The androecium of A. pahni is glabrous, and the anther-sacs are erect, extrorse, and vertically dehiscent. In A. fluminum the staminate flowers are borne either 2--3 together directly at nodes of the primary axis or these may be paired with an abbreviated 1--3-flowered branchlet; the vesture of the leaves is minute, truly appressed; and the drupe large, lenticellate externally, while its endocarp is deeply and coarsely engraved with three wide grooves separated by broad thickened ribs running the whole length of its long outer curve. The androecium is entirely different, papillate all over, some papillae (under X 30) appearing spinulose and up to 0.1 mm long, while the distally dilated, club-shaped filaments are tilted inward at apex, bringing the anther-sacs nearly horizontal to the flower's axis. The sacs of the three outer stamens are collateral and introrse, their horizontal slits coalescent in age; those of the three inner stamens are separated by a narrow connective, therefore latero-introrse, and slightly less strongly tilted, the slits appearing oblique in consequence.

Because of the large size and externally lenticellate surface of the drupe, A. fluminum must be compared also with A. aristeguietae, described from Venezuela but known also (from fruiting material) to occur in Peru. Flowers of A. aristeguietae are, unhappily, still unknown, but the incomplete material is easily distinguished from A. fluminum by the soft, erect pubescence of the undersurface of the leaf-blades and by the interior structure of the fruit. The endocarp of A. fluminum, as already mentioned, is exceptional for the coarseness and depth of its engraved sculpture, and is surrounded by a thin, scarcely fibrous pulp which peels more or less cleanly from the testa when soaked. The testa of A. aristeguietae, equally in Venezuela and Peru, is only moderately engraved, lacks the wide and deep grooves around the long outer curve, and is clothed in a densely fibrous, tow-like pulp which can only be removed by laborious scraping. The pistillate raceme of A. fluminum is loose and open and the fruits are borne on well-developed pedicels. A striking feature of A. aristeguietae is the very short, crowded pistillate inflorescence, and the reduction of the fruiting pedicel to a stout neck no longer than wide. It seems likely that the staminate inflorescence of A. aristeguietae, when discovered, will provide even more decisive differential characters.

This species cannot be introduced easily into our regional keys to Abuta, partly because it occurs on both slopes of the Andes, in Ecuador and Peru. It might be sought in Key B, if this is extended south from Pacific Colombia to adjoining Ecuador. Here it would key to A. racemosa, from which it differs in the hispidulous androecium and the large, lenticellate drupe. In Key E, covering the Amazon Basin, A. fluminum would key, with some difficulty, to A. solimoesensis, from which also it differs in the characters just mentioned.

The collector states on the labels of Schunke 1971/34 and 1971/33: "el tallo es aredondeado, en la parte exterior de color negruzco, y en la interior de color amarillenta, con sabor amargo".



Abuta fluminum, flower ♂: 1) flower; 2) outer sepal; 3) inner sepal (ventral view); 4) androecium. (Schunke 1971/34)

14. Abuta selloana Eichler, Flora 47:389. 1864.

Brazil: São Paulo: J. Mattos 13922 (SP); Parana: G. Hatschbach 16661; Santa Catarina: Reitz & Klein 4128 (US), Reitz 1901 (HBR), Klein 6994 (RB), Klein & Souza 7483 (RB).

15. Abuta panurensis Eichler, Flora 47:390. 1864.

Brazil: Amazonas: basin of the lower Rio Negro, Herb. Schwacke 3461 (18/6-1882) (JBRJ #53656), Krukoff 12104, Prance et al. 14973 (Rio Cuieras), 11575 (near Manaus). Peru: San Martin: Mariscal Caceres, Tocache Nuevo, Schunke 4741 (F).

This is the new record of the species for Peru.

16. Abuta solimoesensis Krukoff & Barneby, Mem. N. Y. Bot. Gard. 20(2):18. 1970.

Peru: San Martin: Mariscal Cáceres, Tocache Nuevo, Schunke 1971/31, 3795, 4638, 5183, 5185.

17. Abuta velutina Gleason, Bull. Torrey Club 58:361. 1931.

Brazil: Amazonas: basin of Rio Negro, between Rio Quinini and Moreira, Prance et al. 15185.

18. Abuta obovata Diels, Notizbl. Bot. Gart. Berlin 13:29. 1936.

Venezuela: Bolivar: "entre los brazos del Río Uei, Steyermark et al. 104578. Brazil: Acre: Cruzeiro do Sul, Prance 12437.

This is the new record of the species from the State of Acre.

20. Abuta brevifolia Krukoff & Moldenke, Bull. Torrey Club 69(2): 160. 1942.

Venezuela: Amazonas: basin of Río Negro, Froes 12387. Brazil: Pará: basin of Rio Jarí, N. T. Silva 3432; Amazonas: basin of Rio Negro, Prance et al. 11627 (capoeira, near Manaus); Acre: basin of Rio Juruá, Cruzeiro do Sul, Prance et al. 12121, 12615.

Excellent staminate inflorescences and flowers recently became available to us: staminate inflorescence arising from young leafy branches, solitary or serial by 2s and 3s, narrowly cymose-paniculate, loosely strigulose throughout with grayish or partly brownish hairs, the simple primary axis (0.6) 1--2.5 dm long, scarcely 1 mm diam at base, the secondary axes ascending, rather distantly disposed by 1--3, sometimes appearing pseudo-verticillate, up to 10 (12) mm long, the longer pedicels at anthesis 1--2 mm long; sepals strigulose externally, the 3 outer ±0.5 mm long, subulate, the 3 inner suborbicular, 1--1.2 X 0.8--1.1 mm,

subcarnose, glabrous within; androecium 6-merous, appearing glabrous but microscopically papillate at X 20, the filaments all free to base, 0.6--0.7 mm long, inversely pyriform in laterally view view but somewhat compressed laterally, the prominulous anther-sacs latero-extrorse, 0.2 mm long, dehiscent by vertical slit. (Prance 12615-NY).

The inflorescence resembles that of related D. obovata, but the androecium consists of six, free filaments all essentially uniform in shape. The androecium of D. obovata consists of 3 outer, narrow and sterile filaments surrounding a united synadrium of 3 inner fertile ones.

This is the first record of the species from Venezuela also from the States of Amazonas and Acre, Brazil.

21. Abuta sandwithiana Krukoff & Barneby, Mem. N. Y. Bot. Gard. 20(2):18. 1970.

Brazil: Amazonas: Maués, terra firme, Froes 33192 (IAN); Acre: basin of Rio Jurua, Cruzeiro do Sul, Prance et al. 12461 (varzea).

This is the new record of the species from the State of Acre.

24. Abuta racemosa (Thunberg) Triana & Planchon, Ann. Sci. Nat. IV. 17:48. 1862.

Panama: Canal Zone: Barro Colorado Island, Croat 9233, 15053.

25. Abuta panamensis (Standley) Krukoff & Barneby, Mem. N. Y. Bot. Gard. 20(2):22. 1970.

Belize: near Mafridyle Lagoon, Percy H. Gentle 7714 (LL). Honduras: Copan: wet thickets along Copan River, alt. 700 m, Molina & Molina 24713.

27. Abuta grandifolia (Martius) Sandwith, Kew Bull. 1937:397. 1937.

French Guiana: Oldeman 1483 (CAY) (creek de la Folie), 1926 (CAY) (creek Gabaret), B-2320 (CAY) (River Sinnamary), 2191 (CAY) and 2197 (CAY) (River Iracoubo), 2766 (CAY), B-2116 (CAY), T-163 (CAY), 2980 (CAY), B-1830 (CAY), B-2189 (CAY) and De Granville 40 (CAY) (all from the basin of Approuague), Oldeman T-360 (CAY) and B-2500 (CAY) (Basin of Oyapock). Brazil: Amazonas: W. Rodrigues 8711 (INPA) (Estrada Manaus-Itacoatiara, km 69), 8855 (INPA 28070) (near Manaus), Prance et al. 11557 (near Manaus), 15714 and 16005 (basin of the upper Rio Negro), 13948 (basin of Rio Purus, vicinity of Labrea); Acre: basin of Rio Jurua, Cruzeiro do Sul, Prance et al. 12116, 12781; Terr. Roraima: Prance et al. 10656. Mato Grosso: R. M. Harley et al.

10426, 11209 (K), J. A. Ratter et al. 937, 1205, 1760 (K). Peru: Poeppig s.n. (BM); San Martín: Mariscal Cáceres, Campanilla, Schunke 4246 (F). Colombia: Putumayo: Robin B. Foster 1565 (COL).

The collections from French Guiana are all from small shrubs up to 4½ m high occurring in the understory of high forest as well as on savana.

VIII. ANOMOSPERMUM Miers in Ann. Nat. Hist. III, 14:101. 1864.

3. Anomospermum bolivianum Krukoff & Moldenke, ex Moldenke, Lilloa 5:234. 1940.

Brazil: Pará: cult. at Ipean: N. T. Silva 3431.

The cited collection is from the same plant as N. T. Silva 843 cited in 8th Suppl. The plant was raised from seeds brought by J. Murça Pires from the basin of Rio Tapajos (Pires 4023 cited in 6th Suppl.).

4b. Anomospermum chloranthum Diels ssp. confusum Krukoff & Barneby, Mem. N. Y. Bot. Gard. 22(2):69. 1971.

French Guiana: "forêt humide semperv. sur Mgne Boeuf-Mort, Oldeman 3231 (CAY). Peru: Huánuco: Pachitea, Honoria, alt. 300/400 m, Schunke 2545 (F); Loreto: near Pongo de Manseriche, Tessmann 4689 (G).

This is the first record of this subspecies from French Guiana.

4c. Anomospermum chloranthum Diels ssp. isthmicola Krukoff & Barneby, Mem. N. Y. Bot. Gard. 22(2):70. 1971.

Panama: Darien: 1-5 miles downstream from El Real, Duke 4929.

5a. Anomospermum reticulatum (Martius) Eichler ssp. reticulatum, Mem. N. Y. Bot. Gard. 22(2):73. 1971.

Brazil: Amazonas: basin of Rio Amazonas, Tefe, Ilha de Miua, Byron 226 (8/4-1970) (INPA 28087); basin of Rio Japurá, Byron 333 (18/4-1970) (INPA 28194); basin of Rio Purus, Lago do Mapongapa, Prance et al. 2562; basin of Rio Negro: Martius s.n. (1864) (L); Territory of Rondonia: basin of Rio Madeira, Prance et al. 6580. Mato Grosso: Rio Suia Missu, R. M. Harley & R. Souza 11132.

This is the first record of the species from the State of Mato Grosso.

5b. Anomospermum reticulatum (Martius) Eichler ssp. dielsianum (Moldenke) Krukoff & Barneby, Mem. N. Y. Bot. Gard. 22(2): 74. 1971.

Brazil: Acre: basin of Rio Jurua, Cruzeiro do Sul, Prance et al. 12562.

This is the first record of the species from the State of Acre.

5c. Anomospermum reticulatum (Martius) Eichler ssp. glabrescens Krukoff & Barneby, Mem. N. Y. Bot. Gard. 22(2):74. 1971.

Venezuela: Tachira: La Fria, A. L. Bernardi 7664 (VEN).

This is the first record of this subspecies from Tachira.

5h. Anomospermum reticulatum (Martius) Eichler ssp.

Habit of subsp. reticulatum but reticulation of leaf-blades fine and almost fully immersed in the epidermis, the larger areoles ±0.2--0.25 mm diam; fruiting peduncles 1--1.5 cm long, at middle 0.8--1 mm diam; drupe (immature) apparently like that of ssp. nitidum in size and in sculpture of endocarp, much smaller than that of ssp. reticulatum at the same stage of maturity, the testa externally foveolate, internally armed around its long curve with a narrow intruded wing and on each side with two rows of small introverted prongs.

Peru: Huánuco: southwestern slope of the Rio Llulla Pichis watershed, on the ascent of Cerros del Sira (in rain forest, c. 1290 m, 9° 26' S, 74° 45' W), Frank Wolfe 12339 (F), 12340 (F).

An interesting record for A. reticulatum sensu lat., the first from sub-Andean Peru, and doubtless representing an undescribed entity, but known only from material with immature drupes. The specimens introduce into A. reticulatum no morphological character not previously recorded in the species, but are marked by an unforeseen syndrome. The finely reticulate leaf-blades, almost as smooth on the upper face as those of Orthomene schomburgkii, recall those of the Venezuelan ssp. venezuelense but the drupe is evidently much smaller, less deeply rugulose but foveolate externally, and armed within by rows of introverted prongs. The sculpture of the endocarp is much like that seen in subsp. idroboi of sub-Andean Colombia or subsp. nitidum of southeastern Brazil, but both of these have coarsely reticulate leaf-blades. It is not possible to foretell from the material at hand the ultimate size of the drupe, but it seems likely to fall within the relatively small range characteristic of subsp. nitidum, certainly below the average size of subsp. reticulatum or subsp. idroboi.

6. Anomospermum steyermarkii Krukoff & Barneby, Mem. N. Y. Bot. Gard. 20(2):30. 1970.

Brazil: Terr. Roraima: vicinity of Uaica airstrip, France 10809.

7. Anomospermum matogrossense Krukoff & Barneby, Mem. N. Y. Bot. Gard. 20:33. 1970.

Brazil: Pará: Portel, região do Anapú, Froes 32948 (BM, SP, IAN).

IX. ORTHOMENE Barneby & Krukoff, Mem. N. Y. Bot. Gard., 22(2):79. 1971.

1. Orthomene schomburgkii (Miers) Barneby & Krukoff, Mem. N. Y. Bot. Gard. 22(2):80. 1971.

Venezuela: upper Orinoco: Lizot 76A (VEN), Surinam: Toekoemoetoe Creek, Daniels A. G. H. & F. P. Yonkers 1338. French Guiana: Oldeman 1515 (CAY) (south of Cayenne), B-2844 (CAY) (basin of the lower Approuague), T-283 (CAY) (basin of Rio Oyapock), R. Schnell 12126 (P) (près de Saut Macaque). Brazil: Amazonas: basin of Rio Negro, Prance et al. 15215 (between Ilha Uabetuba and Ilha da Silva). Peru: Huánuco: Schunke 6545 (F); San Martín, Mariscal Cáceres, Tocache Nuevo, Schunke 1970/29, 3890, 4141, 4561 (F).

2. Orthomene verruculosa (Krukoff & Barneby) Barneby & Krukoff, Mem. N. Y. Bot. Gard. 22(2):81. 1971.

Abuta verruculosa Krukoff & Barneby, Mem. N. Y. Bot. Gard. 20:24. 1970.

Slender high-climbing vines, to 20 m long, the upper stems channeled, sparsely lenticellate, up to 5 mm diam, either glabrous to the inflorescence and drupe or the younger branchlets or lower surface of leaf-blades (or both) finely puberulent with minute, forwardly appressed hairs up to 0.1--0.15 mm long; petiole slender, (2) 4--14 cm long, little inflated at either end; leaf-blade (dry) papery-submembranous, brownish-olivaceous above, lighter brown beneath, plane or somewhat wrinkled but not bullate, the margins revolute, in outline ovate, ovate-oblong, or subobovate, at base either broadly cuneate or truncate-subcordate, at apex short-acuminate (the acumen either acute or obtuse), 8.5--30 cm long, 4--15 cm broad; primary venation of blade of 3 or 5 nerves from exact base, the outer pair (when present) weak and short, submarginal, attaining less than 1/3 length of blade, the inner pair incurved-ascending beyond middle of blade, the costa giving rise at and beyond middle to 2--3 pairs of major incurved-ascending, and throughout its length to many minor, subtransversely divaricate secondaries, these all prominulous beneath, the tertiary venation slender and open,

immersed above, the areoles beneath much <1 mm diam; inflorescence 0 cauliflorous supra-axillary sessile, densely cymose-glomerulate, the flowers crowded into a depressed hemispherical cluster, the axes after fall of the flowers becoming woody-persistent; flower 0 sessile or nearly so: sepals 6--9 (probably 6 but closely subtended by 1--3 similar bracteolar scales), deltate-ovate obtuse concave, all externally pilosulous with short spreading-ascending hairs, the outermost submembranous 0.7--2 mm long and about as wide, the inner (in vernation imbricate) subcarnosulous 1.7--3 mm long; petals 6, flabellate-subtruncate, not fleshy-thickened, 0.35--1.2 mm long, their inflexed margins loosely embracing the opposed filament; androecium glabrous, the 6 filaments all free from base, broadly linear, about as long as opposed petal, at apex abruptly incurved, the anther-sacs almost round 0.3--0.45 mm long, introrsely collateral but separated abaxially by a narrow connective, tilted forward so that the dehiscence-slit becomes obliquely horizontal to the flower's central axis; inflorescence 0 borne in axils of fallen leaves, sessile or subsessile, cymosely 7--9-flowered, not seen at anthesis, the flowers apparently short-pedicellate, the fruiting fertile pedicel becoming 3--5 mm long, 2--2.5 mm diam, puberulent; perianth 0 not seen; drupe subsymmetrically oblong-ellipsoid, 25--28 X 11--13 mm, apiculate by the terminal or obliquely terminal style-base, scarcely compressed laterally, the fleshy, when ripe orange-yellow exocarp drying blackish and intricately verruculose-wrinkled, apparently ±0.5 mm thick when fresh and separated from the endocarp by a layer of watery non-fibrous mesocarp; endocarp 22--25 X 9--10 mm, the testa thinly crustaceous 0.3--0.5 mm thick in section, externally shallowly incised-reticulate, the internal face ±undulate but otherwise unarmed.

French Guyana: basin of Rio Oiapoque (fleuve Oyapock), left bank of Oyapock at Moutouci Fall, frts. in May, 1970, Oldeman T-712 (CAY); left bank of river Yaroupi at Tainoua Fall, frts. in Apr., 1970, Oldeman T-550 (CAY), de Granville 428 (CAY). Brazil: Amapa: basin of Rio Oiapoque, ±5 km s.w. of mouth of Rio Ingarari, fl. 0 in Sept., 1960, Irwin, Pires & Westra 48358 (IAN, K, NY). Colombia. Vaupes: Rio Inirida, alt. 200 m, frts. in Feb., 1953, Fernandez 2313 (COL) (type of Abuta verruculosa).

Described as a high-climbing, slender-stemmed liana (Irwin et al.), up to 10--20 m long, woody at base, climbing by means of twining terminal stems (de Granville); the ripe fruits subcylindric, orange (de Granville) or yellow (Oldeman); the staminate flower yellowish-brown (Irwin et al.).

The discovery along the Amapa-French Guiana boundary of three fruiting collections of the recently described O. verruculosa is not only of exceptional phytogeographic interest but has enabled us to recognize in a hitherto enigmatic staminate flowering plant collected in the same region the male counterpart of a unique species. The new material of O. verruculosa,

known hitherto from a single pistillate plant collected in Vaupes, Colombia, expands our knowledge of its species so greatly that we believe it proper to present a revised and amplified description embodying all data now at hand.

The fleshy, when dry elaborately wrinkled and thereby apparently warty drupe of the plants from the Oiapoque (on the French bank called Oyapock) River and its tributaries are identical with that of the Colombian typus. The plants of the two areas differ slightly in that the one example from Colombia is glabrous except for the inflorescence and drupe, whereas those from Guiana have young stems (sometimes) and leaf-blades beneath (always) finely puberulent with minute, forwardly appressed hairs. The latter show also a greater variation in size of leaf-blade than could be foreseen from study of the Colombian typus, but we interpret the variation in amplitude and in pubescence as trivial and of no taxonomic significance. The puberulent leaf-type associated with the characteristic drupe is matched very closely by the staminate plant collected on the Brazilian bank, with this slight further difference, that the acumen of the leaf blade is obtuse rather than triangular-acute as in all other plants studied. Here again we believe the difference inconsequential. The staminate inflorescence of O. verruculosa turns out to be a good counterpart to the pistillate one, which is unique in Orthomene by being subsessile and cymulose. At anthesis the staminate inflorescence forms a depressed hemisphere of closely crowded flowers sessile above the axil of fallen leaves. After the flowers are shed the axes become indurated and persist on the old stems in the form of corky burls. The pistillate inflorescence, not known at anthesis, is similarly organized but (as usual in the family) simpler than the staminate one, composed of about 7 or 9 flowers of which only one or two bear fertile fruits, these by abortion of two of the three carpels appearing solitary.

The individual staminate flower of O. verruculosa marks a departure from what has been thought normal in the genus, the perianth being of submembranous texture, not at all fleshy-thickened as in the generitype, O. schomburgkii, and the petals not crowded into a button-like pseudodisk. Moreover the filaments are abruptly incurved at apex so as to tilt the anther-sacs forward, the structurally vertical dehiscence-slit becoming in consequence obliquely horizontal to the axis of the flower. These features which are shared by no other Orthomene are the very ones that distinguish, in the related genus Anomospermum, a subgenus Elissarrhena, and if we had nothing to base our classification upon other than the male sex, O. verruculosa would fit neatly into subgenus Elissarrhena, just as O. schomburgkii would fit into subgenus Anomospermum. Basing our classification primarily on the organization of the seed, we interpret O. verruculosa, like the members of Anomospermum sect. Elissarrhena, as having retained a relatively primitive (unspecialized) staminate inflorescence and individual staminate flower while other mem-

bers of each genus have developed a simplified cyme and a fleshy perianth by parallel evolution. Insofar as O. verruculosa now stands in the same relation to the remainder of its genus as does subgenus Elissarrhena to subgenus Anomospermum, it will probably deserve eventually to figure as typus of a subgenus of Orthomene. We prefer to wait until the still lacking staminate inflorescence of O. prancei can be studied before taking any step in this direction.

Changes in the identifications

	Cited originally as	Cited later as
Krukoff 12104 (sterile)	Abuta grandifolia (4:159)	Abuta panurensis (9th Suppl.)
Froes 12387 (sterile)	Abuta grandifolia (5:403)	Abuta brevifolia (9th Suppl.)
Mathias & Taylor 5022 (sterile)	Telitoxicum krukovii (7a:47)	Telitoxicum peruvianum (9th Suppl.)
Froes 12423 (sterile)	Abuta negroensis (5:400)	Telitoxicum negroense (9th Suppl.)

Bibliography

(In order to conserve space, we are citing here only papers not cited in Supplement VI).

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7b. _____ & _____. Supplementary notes on American Menispermaceae. VII. Mem. N. Y. Bot. Gard. 20(2):71-80. 1970.

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